THE DESTRUCTION OF ARCHAEOLOGICAL SITES AND DATA

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> *It takes only a period of about a dozen years to implant a basic culture in the mind of man--the period between the age of two and the age of fourteen. In a psycho-biological sense, history, tradition, and custom are only about 12 years old (Beardsley Rumi, World Trade and Peace Address, 1945).*

Introduction

Archaeological sites are widely recognized as being limited in number and nonrenewable, much like several other natural resources. What distinguishes archaeological sites from many of the other resource concerns is their fragility, informational context, and necessary role in the theoretical, methodological and technical approaches for archaeological investigations of the past. Archaeologists and the interested public are acutely aware of the intrinsic nature of this resource base and of the need to protect it, both for wise use for research and preservation of significant resource elements for future generations.

Unfortunately, the characteristics of the archaeological record that make it so valuable also render it highly vulnerable to destructive forces generated from both natural and human origins. Cultural materials that make up the archaeological context range from being highly perishable, capable of being preserved only under the most unusual conditions, to nearly indestructible items such as stone and ceramic artifacts. However, for the archaeologist the spatial and temporal relationships are as important to reconstruction and interpretation of the past as the cultural debris itself.

This article provides a brief overview of the destructive processes which lead to alteration or loss of archaeological sites and data. We need to understand the stresses in today's environment, and we need to be able to predict the severity and rate of loss associated with the various threats. This forum only allows for a superficial examination of the overall situation, but the discussion will provide a background for other articles in this volume which outline various approaches for protecting archaeological sites.

Archaeological Sites as Resources

Before the various forces contributing to loss of archaeological sites and data are examined, a brief review of why archaeological sites deserve protection is beneficial. Historically, archaeological sites have been of great interest and value to the professionals and concerned avocational archaeologists who study the remains and lifeways of past human communities. Many of the larger important sites have also generated interest among the

public in their appreciation for things of the past. Over the past few decades our sociey has come to realize that archaeological sites are finite in number and there has been an awareness that vestiges of our cultural heritage are being methodically destroyed, often at an alarming rate. The increasing demands upon our natural resources and the ever growing use of land surface throughout the country have prompted increased concern for the archaeological sites that remain in place.

While the archaeological site is often the center of the concern, we should remember that our concerns are better targeted at a larger picture, which may be designated as the cultural resource base. Lipe (1984) has defined the cultural resource base as "the material things produced by past human activity--the artifacts, manufacturing debris, middens, structures, monuments, and the like, that have survived from some time in the past into the present." Lipe also notes that the landscapes of past cultures may also qualify as cultural resources.

Professional interest in the preservation of such resources lies in the fact that archaeological remains are a limited, fragile, nonrenewable part of the environment, and any disturbance creates irreversible and cumulative impacts. The following quote from an article by Scovill, Gordon, and Anderson (1977:44) succinctly expresses the important characteristics of archaeological resources for the professional community:

> The investigation of the archaeological record of the American continent is the serious and scientific study of humankind over a span of time numbered in the tens of thousands of years. The study seeks knowledge-knowledge to describe, to explain, and to understand the behavior of past peoples and their interactions as integral parts of changing cultural and natural systems. Cultural history, cultural physiography, cultural ecology, and cultural processes are the current emphasis in the anthropological study of the past through the archaeological record.
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> Archaeological resources predominantly consist of the physical evidences, or cultural debris, left on the landscape by past societies.... Of high significance to the investigation, analysis, and interpretation of the cultural debris are the local and regional geomorphological sequences, soil composition, and modern biological and botanical baseline indicators. Critically essential to the methodologies, techniques, and processes of studying archaeological resources is the preservation of the undisturbed stratigraphic context of the cultural debris. Directly stated, the cultural debris of this nation's archaeological resources have no value for studying the past once they have been rearranged on the landscape by a bulldozer or a dragline.

These two paragraphs by Scovill and his co-authors clearly convey the feeling of the professionals regarding archaeological sites as significant resources and point to the reasons why protection of these resources is important for those charged with management of the nation's public lands. In addition to protection and wise use of the resource base today, we also need to be concerned with proper stewardship and preservation of resource elements for the future. As noted some years ago in an article by William Lipe (1974), it is highly desirable to save archaeological sites in place whenever possible as opposed to excavating them without consideration of preservation and thereby promoting removal of yet another piece of the rapidly

disappearing resource. Lipe's arguments for a conservation ethic within the profession still have considerable relevance today.

An Overview of Archaeological Site Destruction

A number of agents can be identified which, in most cases, result in either damage, alteration, or complete loss of archaeological sites and data when the agent and the resource come into conflict. An outline of these destructive agents is shown in Figure 1. To be sure, additional sources of disturbance could readily be identified and added to the list; however, those categories indicated cover the major threats to the resource base.

Before these categories are examined, some general comments can be offered concerning the various agents of destruction as they relate to site and data loss. The first, and perhaps most obvious, fact is that a large degree of interrelationship exists between the agents and modes of resource destruction noted in Figure 1 in that much association with respect to cause and effect circumstances is clearly evident among the various categories. For example, in some cases recreation on public lands and hobby collecting (or even malicious vandalism) may be considered interrelated activities. In other instances, the two may be quite differentiated. Likewise, a combination of erosion impacts and land reclamation undertakings may create an environmental battlefield with archaeological sites being among those resources caught in the middle.

The agents of destruction under discussion are not in every case completely harmful to archaeological sites and data. For example, many important archaeological sites would go unrecognized if not for natural erosion or human-caused land alteration, or even as a result of the efforts of interested hobbyists. Some of these agents, particularly the human incidental categories, lead to critical funding for data recovery programs when such activities take place on federal or state lands. However, far more archaeological sites are lost to these agents than are preserved, on public and private lands alike. It is well recognized that with the present legal, funding, and management situations, every worthy site cannot be investigated or even saved. On the positive side, though, the impacts generated by certain forms of destructive activities can be mitigated through increased effectiveness of educational and protective programs. Moreover, interest in reducing the effects of vandalism and finding ways to physically protect endangered resources is on the increase and meaningful results should be evident in the near future.

We also need to keep in mind that the archaeological record, by its very definition, is one that has lost important elements of critical information due to various destructive processes. As Michael Schiffer has noted in his various writings (e.g., 1976, 1983, 1987) on the formation processes affecting the archaeological record, cultural materials suffer varying degrees of informational loss as they are transformed from a systemic or ongoing behavioral system to the archaeological context. The rate of loss is especially calamitous for perishable items. Schiffer goes on to point out that the archaeological record may undergo changes which transform cultural materials from one state to another within the archaeological context (e.g., natural erosion or human intervention such as plowing or land leveling), and that the archaeological

context may even return to a systemic one when the archaeologist (or vandal) retrieves the cultural materials. Our concern in this discussion is limited to the destructive processes which take place within the archaeological context and, more importantly, the conflicts which arise as the materials come face to face with the systemic contexts of today.

Agents of Destruction

Sources of potential destructive forces for archaeological sites and data come from almost every conceivable source in the environmental setting. The two major categories include those of a natural origin and those associated with human activities on the landscape. The human agents can be further subdivided into incidental and intentional actions.

Natural Agents

Natural processes and events which affect archaeological sites are legion, ranging from the effects of earthworm and crayfish soil mixing to the devastating consequences of volcanic and earthquake events. In between these extremes we find that the activities of various plants and animals and erosive actions of wind, water, and temperature take a great toll on cultural materials in the archaeological context, leading to loss of items and abundant variation in the record. For the interested, excellent descriptions and discussions of these processes as they relate to archaeological sites can be found in Mathewson (1989), Schiffer (1987), Wildesen (1982), and Wood and Johnson (1978).

Human Agents

Human-caused actions which have harmful effects on archaeological sites and data are also multitudinous and continue to increase in number and magnitude as lands are developed and exploited and the pressures of population expansion increase. By and large, legislative actions at both the federal (see McManamon this volume) and state levels have been enacted to lessen or mitigate the effects of associated impacts to archaeological sites on public lands; however, the problems associated with many types of activities have in no way been totally eliminated. As they pertain to archaeological sites, destructive actions can be divided into two subcategories: incidental and intentional. As noted previously, the various actions which may be listed under either one of these headings are not totally independent of each other. The advent or growth of a land development activity, for example, will surely create a host of interrelated potential impacts, both in the short-and long-term, including, in all probability, a rise in the incidence of vandalism or depreciative behavior.

Incidental Actions

These activities may be defined as those destructive actions associated with the many forms of land development and resource exploitation that take place on the landscape. In other words, the destruction of archaeological sites and data is not the primary motive behind such actions, but the end result is that another part of the archaeological record disappears from the landscape. These activities may be generally categorized as (1) land development; (2) agriculture

and land clearing; (3) grazing; (4) land reclamation and flood control; (5) water development projects; (6) recreational pursuits; (7) construction of roads, public utility features and pipelines; (8) mining and quarrying; and (9) industry.

In many cases, the precise effects of these types of land alteration activities have not been quantified; however, it is not difficult to imagine that each undertaking creates special and ultimately harmful results for the archaeological record if allowed to continue unchecked. These impacts lead to either partial or total destruction, or, at best, mixing and displacement of the resources.

Fortunately, the recent emphasis on proper resource management on public lands has brought about a better understanding of the range and seriousness of impacts resulting from such activities. This emphasis has also led to regulated identification and evaluation of archaeological resources in the impact zones and, when needed, effective mitigation of the adverse effects resulting from those impacts.

The body of literature examining the interplay between human occupation and use of the landscape and protection and preservation of archaeological sites and data has grown over the past twenty years as archaeologists have become more aware of the need to better understand the overall effects of such undertakings. Thus we can find references providing data on such potentially destructive and diverse activities as military training (Carlson and Briuer 1986), livestock grazing (Osborn et al. 1987), forest chaining (DeBloois et al. 1975, Haase 1983), river navigation (Gramann 1981), agricultural practices (Ford and Rollingson 1972,Medford 1972, Roper 1976, and Knoerl and Versaggi 1984), reservoir inundation (Lenihan et al. 1981), stream channelization (Schiffer and House 1977), traffic vibrations on prehistoric structures (King and Algermissen1985), fire (Kelly and Mayberry 1980, Noxon and Marcus 1983, and Switzer 1974), and tourism (Gale and Jacobs1987). In spite of these and other studies, many gaps still exist in our knowledge pertaining to the nature of specific impacts on archaeological resources from the various land disturbing activities listed above.

Intentional Actions

Intentional actions which lead to loss of archaeological sites and data are critical in that they are inherently harmful to the resource base, but, in most cases, are guided by motives that are difficult to prevent or control. The worst of these actions, those related to vandalism, are particularly damaging since they lead to destruction without any return of scientific information. Intentional actions causing resource destruction can be subdivided into three categories: institutionalized destruction, predatory vandalism, and malicious vandalism.

Institutionalized Destruction: Some forms of archaeological site and data destruction have been either tolerated or accepted over the years. In this category, we refer to the loss of cultural materials and information that occurs during professional investigation or associated with the management of archaeological resources.

At first, it may appear that to designate the activities of the archaeologist, whose goal it is to retrieve data from the archaeological context and make sense of it, as being destructive is

somewhat contradictory. Realistically, however, it must be said that each and every archaeological endeavor leads to the loss of varying amounts of information. This situation will never be completely alleviated since far too many factors are involved (e.g., professional competence, data recovery techniques, and time and funding constraints). Further, we must recognize that a tremendous amount of archaeological data was lost during the early phases of discovery and investigation in this country when zeal often took predominance over scientific discretion. It is, however, difficult to excessively castigate many of those early efforts from our present-day vantage point. Undoubtedly, our successors will at some point in the future decry the "primitive" data recovery and analytical techniques used by archaeologists in the 1980's and 1990's and complain of the data loss which took place.

More to the point at hand, certain archaeological practices, which unfortunately continue to exist, do result in intentional and harmful effects to the resource base. These actions range from survey techniques in which, for example, artifacts are collected without corresponding mapping of artifact loci, to much more serious problems involving the use of limited research designs to guide excavation of archaeological sites. Even more damaging is the act of conducting investigative work and not pursuing the necessary analysis and reporting of the results. It is probably fair to state that in the past and even today some archaeological fieldwork was/is undertaken without any intention on the part of the investigator to adequately analyze the resultant data and make them available. Hopefully, the time is near when well-meaning but overworked investigators are no longer allowed to conduct field work beyond their capacity, professional or financial, to effectively complete the research process. As has been noted by others, this practice is little more than a form of archaeological vandalism.

Similar losses of archaeological sites and data can result from management practices on the part of agencies charged with this responsibility (see Spoerl 1988). Actions leading to resource destruction can include ineffective management orientations, a lack of rigorous evaluation methodologies for evaluating significance of sites, or failure to fully realize the impacts that an agency's activities or operations may have on archaeological resources. Examples of the latter activities might include the side effects from timbering actions or shoreline and downstream impacts to archaeological sites from operation of a reservoir.

Predatory Vandalism: This form of intentional activity is the most widespread and leads to the most serious consequences for archaeological resources (Nickens et al. 1981, U.S. General Accounting Office 1987). It is characterized by a motive dictated by personal gain, either of a noncommercial or commercial nature. In the first case, the effort may involve actions such as adding items to one's collection of relics, satisfying a curiosity about antiquities, or perhaps egocentric autographing of resource sites. Commercial ventures are guided by a motive of retrieving artifacts for sale and profit. In either case, the impact to archaeological resources is much the same, loss of cultural elements and contextual information.

To understand the problem it will be useful to examine its extent as indicated by one study completed a few years ago. In that investigation, Williams (1978) surveyed the management problem of cultural resource vandalism in federal and state agency recreation areas throughout the Rocky Mountain West. In compiling the results provided by resource managers throughout

several states, Williams listed the following vandalism practices which impact cultural resource sites (arranged in decreasing order by reported absolute frequency):

Excavation (digging, pothunting, use of heavy machinery)
Carving, scratching, chipping, general defacement
Surface collection of artifacts (especially lithic artifacts)
Removing, shooting at, painting, chalking, making casts and tracings of rock art
Theft of artifacts from structures
Stripping weathered boards or other timbers
Removing part or all of a structure or causing structural damage
Dismantling, general destruction of structure (but apparently no removal)
Arson
Climbing or walking on resources
Building new roads over, using modern vehicles on historic roads, offroad recreational
vehicle use
Rearrangement of or relocating of resources
Breaking artifacts, objects, windows
Breaking and entering
Knocking structures over
Use as firewood
Throwing rocks into excavated ruin
Handling, touching

Malicious Vandalism: The final category of intentional vandalism includes acts which may be classified as those brought about by revenge or frustration with government policies, or those which result from no discernible motive at all (Chokhani 1979:10). Basically, this category of vandalism includes those inexplicable, unprovoked actions for which there are no avowed motives. Such behavior can be the result of wanton activities, or even the end product of psychotic or inebriate conduct. Fortunately, this type of aggressive vandalism, quite often highly destructive in nature, occurs less frequently in comparison to other forms of vandalistic behavior. An example of such senseless vandalism occurred in 1979 at Arches National Park near Moab, Utah, where a highly significant rock art panel was obliterated by brushing a chemical solvent across the panel face (Noxon and Marcus 1980).

Conclusion

The aim of the foregoing discussion has been to review the various agents which interact to extirpate elements of our nation's archaeological heritage. The importance of maintaining archaeological sites in pristine conditions cannot be understated, nor can the need to provide protection and preservation for the vestiges of this resource. The actions of natural processes upon archaeological sites and the ever-expanding demands by our population on the landscape are agents of destruction that will continue to adversely affect archaeological resources. It is simply not possible to completely halt all the detrimental stresses resulting from environmental

processes. The effects of such impacts can, in many cases, be mitigated by using physical protection technologies, given appropriate need and funding. It should be noted that the natural agents of destruction tend to occur more slowly than human-caused actions and therefore may be considered to have a lower overall priority in cultural resource management than those detrimental effects tied to human activities. However, given the amount of past destruction of archaeological sites and data and that continuing today, we cannot afford hesitation on any front of the conservation battle.

While some problems still exist, incidental impacts to archaeological resources as by-products of land alteration and resource exploitation are by and large mitigated by legislative enactments, at least on federal and state lands. Control of vandalism, however, continues to be a formidable challenge. Severe problems continue to be associated with destructive actions on private lands, with the result being that valuable archaeological remains are disappearing at an alarming rate. This fact makes it even more important that such resources on public lands be adequately protected.

References Cited

Carlson, D. L. and Briuer, F. L. (1986) Analysis of Military Training Impacts on Protected Archaeological Sites at est Fort Hood, Texas. U.S. Army Fort Hood, Archaeological Resource Management Series, Research Report No. 9, Fort Hood.

Chokhani, P. (1979) Destruction on the Public Lands: A Closer Look at Vandalism. Our Public Lands 29:9-11.

DeBloois, E., Green, D., and Wylie, H. (1974) A Test of the Impact of PinyonJuniper Chaining on Archaeological Sites. U.S.D.A. Forest Service, Intermountain Region, Ogden.

Ford, J. L. and Rolingson, M. (1972) Site Destruction Due to Agricultural Practices in Southeast Arkansas. Arkansas Archeological Survey, Research Series 3:1-40.

Gale, F. and Jacobs, J. M. (1987) Tourists and the National Estate: Procedures to Protect Australia's Heritage. Australian Heritage Commission, Publication Series No. 6, Canberra.

Gramann, J. H. (1981) Navigation-Related Impacts on Cultural Resources of the Upper Mississippi River System. Contract Abstracts and CRM Archeology 2(3):11-16.

Haase, W. R. (1983) Mitigation of Chaining Impacts to Archaeological Sites. Journal of Range Management 36:158-160.

Kelly, R. E. and Mayberry, J. (1980) Trial by Fire: Effects of NPS Burn Programs upon Archaeological Resources. In Proceedings of the Second Conference on Scientific Research in the National Parks, Vol. 1, pp. 603-610, U.S. Government Printing Office, Washington.

King, K. W. and Algermissen, S. T. (1985) Seismic and Vibration Hazard Investigation of Chaco Canyon National Park. U.S. Geological Survey Open File Report 85-529, Denver.

Knoerl, J. J. and Versaggi, N. (1984) Plow Zone Sites: Research Strategies and Management Policy. American Archaeology 4:76-80.

Lenihan, D. J., Carrell, T. L., Fosberg, S., Murphy, L., Rayl, S. L., and Ware, J. A. (1981) The Final Report of the National Reservoir Inundation Study, 2 Vols. National Park Service, Southwest Cultural Resources Center, Santa Fe.

Lipe, W. D. (1974) A Conservation Model for American Archaeology. The Kiva 39:213-243.

Lipe, W. D. (1984) Value and Meaning in Cultural Resources. In Approaches to the Archaeological Heritage, pp.1-11. Ed. H. Cleere, Cambridge University Press, Cambridge.

Mathewson, C. C., Ed. (1989) Interdisciplinary Workshop on the PhysicalChemical-Biological Processes Affecting Archeological Sites. U.S. Army Engineer Waterways Experiment Station, Contract Report EL-89-1, Vicksburg.

Medford, L. D. (1972) Agricultural Destruction of Archeological Sites in Northeast Arkansas. Arkansas Archeological Survey, Research Series, 3:41-82.

Nickens, P. R., Larralde, S. L. and Tucker, G. C. (1981) A Survey of Vandalism to Archaeological Resources in Southwestern Colorado. Bureau of Land Management - Colorado, Cultural Resources Series, No. 11, Denver.

Noxon, J. S. and Marcus, D. A. (1980) The Moab Panel Site of Southeastern Utah: Its Defacement and Significance in Southwestern Prehistory. American Rock Writing Research Newsletter 1(5-80):1-3.

Noxon, J. S. and Marcus, D. A. (1983) Wildfire-Induced Cliff Face Exfoliation and Potential Effects on Cultural Resources in the Needles District of Canyonlands National Park, Utah. Southwestern Lore 49(2):1-8.

Osborn, A., Vetter, S., Hartley, R., Walsh, L., and Brown, J. (1987) Impacts on Domestic Livestock Grazing on the Archaeological Resources of Capitol Reef National Park, Utah. National Park Service, Midwest Archeological Center, Occasional Studies in Anthropology, No. 20, Lincoln.

Roper, D. C. (1976) Lateral Displacement of Artifacts Due to Plowing. American Antiquity 41:372-375.

Schiffer, M. B. (1976) Behavioral Archeology. Academic Press, New York.

Schiffer, M. B. (1983) Toward the Identification of Formation Processes, American Antiquity 48:675-706.

Schiffer, M. B. (1987) Formation Processes of the Archaeological Record. University of New Mexico Press, Albuquerque.

Schiffer, M. B. and House, J. H. (1977) Assessing Impacts: Examples from the Cache Project. In Conservation Archaeology: A Guide for Cultural Resource Management Studies, pp. 309-320. Eds. M. B. Schiffer and Gumerman, G. J., Academic Press, New York.

Scovill, D. H., Gordon, G. J., and Anderson, K. M. (1977) Guidelines for the Preparation of Statements of Environmental Impact on Archaeological Resources. In Conservation Archaeology: A Guide for Cultural Resource Management Studies, pp. 43-62. Eds. M. B. Schiffer and Gumerman, G. J., Academic Press, New York.

Spoerl, P. M. (1988) Management Impacts on Cultural Resources: an Assessment of Forest Service Research Needs. In Tools to Manage the Past: Research Priorities for Cultural Resources Management in the Southwest, pp. 17-25. Eds. J. A. Tainter and Hamre, R. H., U.S.D.A. Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report RM-164, Fort Collins.

Switzer, R. R. (1974) The Effects of Forest Fire on Archaeological Sites in Mesa Verde National Park, Colorado. The Artifact 12:1-8.

U.S. General Accounting Office (1987) Cultural Resources: Problems Protecting and Preserving Federal Archeological Resources. GAO/RCED-88-3. U.S. Government Printing Office, Washington.

Wildesen, L. E. (1982) The Study of Impacts on Archaeological Sites. In Advances in Archaeological Method and Theory, Vol. 5, pp. 51-96. Ed. M. B. Schiffer, Academic Press, New York.

Williams, L. R. (1978) Vandalism to Cultural Resources of the Rocky Mountain West. U.S.D.A. Forest Service, Southwestern Region, Cultural Resources Report No. 21, Albuquerque.

Wood, W. R. and Johnson, D. L. (1978) A Survey of Disturbance Processes in Archaeological Site Formation. In Advances in Archaeological Method and Theory, Vol. 1, pp. 315-381. Ed. M. B. Schiffer, Academic Press, New York.